ISSUE REPORT

Prevention for a Healthier California:

INVESTMENTS IN DISEASE PREVENTION YIELD SIGNIFICANT SAVINGS, STRONGER COMMUNITIES

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The California Endowment

Prevention Institute
Putting prevention at the center of community well-being

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PREVENTING EPIDEMICS. PROTECTING PEOPLE.

Trust for America's Health is a non-profit, non-partisan organization dedicated to saving lives and making disease prevention a national priority.

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Introduction

SECTION 1

Even though America spends more than $2 trillion annually on health care -- more than any other nation in the world -- tens of millions of individuals suffer every day from preventable diseases like type 2 diabetes, heart disease, and some forms of cancer that rob them of their health and quality of life.[1] California health care spending accounts for approximately 8 percent of the U.S. costs -- more than $169 billion annually.[2] The rate of spending has increased far faster than inflation over the past 15 years.[3, 4]

Keeping people healthier is one of the most effective ways to reduce health care costs. This study, which was developed through a partnership of the Trust for America's Health (TFAH), The Urban Institute, The New York Academy of Medicine (NYAM), the Robert Wood Johnson Foundation (RWJF), The California Endowment (TCE), and Prevention Institute, examines how much California and the country could save in health care costs if we invested more in disease prevention, specifically by funding proven community-based programs that result in increased levels of physical activity, improved nutrition, and a reduction in smoking and other tobacco use rates.

TFAH, Prevention Institute, and The California Endowment found that an investment of $10 per person per year in proven community-based programs to increase physical activity, improve nutrition, and prevent smoking and other tobacco use could save California more than $1.7 billion in annual health care costs within 5 years. This is a return of $4.80 for every $1.

Out of the $1.7 billion, the state and federal government could each save more than $84 million in MediCal costs, private payers in the state could save more than $1 billion, and federal Medicare saving would be more than $468 million.

Over time, the state's cost savings could increase. In 10-20 years, the savings could grow to more than $1.9 billion annually, which would be a return of $5.40 for every $1.

The benefits would not just be financial, they could also spare many Californians from developing preventable diseases, including type 2 diabetes, high blood pressure, heart disease, and stroke.

This analysis focused on disease prevention programs that do not require medical care and that target communities or at-risk segments of communities. Examples of these programs include providing increased access to affordable nutritious foods, increasing sidewalks and parks in communities, and raising tobacco tax rates.

The findings are based on a model developed by researchers at the Urban Institute and a review of evidence-based studies conducted by The New York Academy of Medicine. The researchers found that many effective prevention programs cost less than $10 per person, and that these programs have delivered results in lowering rates of diseases that are related to physical activity, nutrition, and smoking. The evidence shows that implementing these programs in communities could reduce rates of type 2 diabetes and high blood pressure by 5 percent within 2 years; reduce heart disease, kidney disease, and stroke by 5 percent within 5 years; and reduce some forms of cancer, arthritis, and chronic obstructive pulmonary disease by 2.5 percent within 10 to 20 years.

If California reduced type 2 diabetes and high blood pressure rates by 5 percent the state could save more than $621 million in heath care costs; reducing heart disease, kidney disease, and stroke rates by 5 percent could raise the savings to more than $2 billion; and with additional 2.5 percent reductions in the prevalence of some forms of cancer, chronic obstructive pulmonary disease (COPD) and arthritis savings could increase to nearly $2.3 billion.

Community Intervention Logic Model

CALIFORNIA RETURN ON INVESTMENT OF $10 PER PERSON (In 2004 dollars)

	1-2 Years	5 Years	10-20 Years
Total State Savings	$621,400,000	$2,092,700,000	$2,297,700,000
State Net Savings (Net savings = Total savings minus intervention costs)	$262,900,000	$1,734,300,000	$1,939,300,000
ROI for State	0.73:1	4.84:1	5.41:1

Note: When ROI equals 0, the cost of the program pays for itself. When ROI is greater than 0, then the program is producing savings that exceed the cost of the program.

Nationally, the U.S. could save more than $16 billion annually within 5 years.

NATIONAL RETURN ON INVESTMENT OF $10 PER PERSON (Net Savings in 2004 dollars)

	1-2 Years	5 Years	10-20 Years
U.S. Total	$2,848,000,000	$16,543,000,000	$18,451,000,000
ROI	0.96:1	5.6:1	6.2:1

Note: When ROI equals 0, the cost of the program pays for itself. When ROI is greater than 0, then the program is producing savings that exceed the cost of the program.

RETURN ON INVESTMENT

In general, ROI compares the dollars invested in something to the benefits produced by that investment:

$$\text{ROI} = \frac{(\text{benefits of investment - amount invested})}{\text{amount invested}}$$

In the case of an investment in a prevention program, ROI compares the savings produced by the intervention, net of the cost of the program, to how much the program cost:

$$\text{ROI} = \frac{\text{net savings}}{\text{cost of intervention}}$$

When ROI equals 0, the program pays for itself. When ROI is greater than 0, then the program is producing savings that exceed the cost of the program.

The researchers found 84 studies that met their criteria and developed the assumptions for the drops in disease rates and the costs of the programs based on these studies. To be included in the review, the studies had to focus on:

1) Prevention programs that do not require medical treatment;

2) Programs that target communities rather than individuals; and/or

3) Evidence-based programs that have been shown to reduce disease through improving physical activity and nutrition and preventing smoking and other tobacco use in communities.

Examples of the types of studies include programs that:

- Keep schools open after hours where children can play with adult supervision;
- Provide access to fresh produce through farmers markets;
- Make nutritious foods more affordable and accessible in low-income areas;
- Require clear calorie and nutrition labeling of foods;
- Provide young mothers with information about how to make good choices about nutrition;
- Offer information and support for people trying to quit smoking and other tobacco use; and
- Raise cigarette and other tobacco tax rates.

Note: Additional examples can be found in the Methodology Section in Appendix A and a full list of all the studies is available in Appendix B: Bibliography of the Literature Review.

To build the model, the researchers evaluated:

- Which diseases can be affected by improving physical activity and nutrition and preventing smoking and other tobacco use;
- How effective programs are at reducing rates of disease;
- The range of estimated costs for these types of programs;
- The current rates of these diseases and current costs for treating these diseases; and
- The amount that could be saved if disease rates were reduced based on the estimates.

The project researchers built this model to yield **conservative estimates** for savings -- using low-end assumptions for the impact of these programs on disease rates and high-end assumptions for the costs of the programs. In addition, the health savings costs in this model are in 2004 dollars and do not include spending in nursing homes, which is significant for these conditions. They also assumed the programs would only result in a one-time reduction in the prevalence of each disease. For instance, they assumed type 2 diabetes rates would only drop once even though the programs would continue over time, and it is likely the rates would continue to drop as the programs continued over the years. This assumption helps take into account the possibility that some people may backslide while others may continue to improve.

The model also does not take into account potential savings for increases in worker productivity, which could be significant. For example, smoking-caused productivity losses currently total more than $90 billion per year, not even including the losses from smokers taking more sick days than non-smokers.[5] Nor does it take into account the effect of the prevention programs on other health conditions that might be reduced as a result of these interventions (e.g., increasing exercise improves heart health as well as risk of injury due to falling).

Also, this report looks at possible returns for the state overall, but if prevention investments were targeted toward communities where health problems are higher than average, it could potentially lead to even greater returns.

ROI FOR PAYERS: MEDICARE, MEDICAID, AND PRIVATE INSURERS

In addition to total dollars saved, the study looked at how this investment could benefit different health care payers.

In California, for MediCal, the state and federal government could each save $12.7 million annually within one to 2 years; more than $84 million annually within 5 years; and $94 million annually within 10 to 20 years.

Private payers in the state could annually save $166 million in one to 2 years; more than $1 billion within 5 years; and more than $1.2 billion within 10 to 20 years.

Medicare savings in the state could total $71 million in one to 2 years; more than $468 million within 5 years; and more than $523 million within 10 to 20 years.

ESTIMATES OF CALIFORNIA SAVINGS BY PAYER: PROPORTION OF NET SAVINGS FOR AN INVESTMENT OF $10 PER PERSON (In 2004 dollars)

	1-2 Years	5 Years	10-20 Years
MediCal Net Savings (state) (proportion of net savings)	$12,700,000	$84,100,000	$94,000,000
Private Payer and Out of Pocket Net Savings (state) (proportion of net savings)	$166,400,000	$1,097,800,000	$1,227,600,000
Medicare Net Savings (federal) (proportion of net savings)	$71,000,000	$468,200,000	$523,600,000
MediCal Net Savings (federal) (proportion of net savings)	$12,700,000	$84,100,000	$94,000,000

Note: TFAH applied national parameters to state spending data based on calculations from preliminary Urban Institute estimates

Nationally, Medicare could save more than $487 million annually in the first one to 2 years, more than $5.2 billion annually within 5 years, and nearly $5.9 billion annually in 10 to 20 years. Annually, Medicaid could save $370 million annually in the first one to 2 years, $1.9 billion annually within 5 years, and more than $2 billion annually in 10 to 20 years. And annually, private insurers and individuals (through reductions of out-of-pocket costs) could see the biggest savings, with nearly $2 billion annually, in the first one to 2 years, more than $9 billion annually within 5 years, and more than $10 billion annually in 10 to 20 years.

Net Savings By Medicare, Medicaid, And Private Insurers For An Investment Of $10 Per Person

	1-2 Years	5 Years	10-20 Years
Medicare, U.S. Total	$487,000,000	$5,213,000,000	$5,971,000,000
Medicaid, U.S. Total	$370,000,000	$1,951,000,000	$2,195,000,000
Other payers and out-of-pocket, U.S. Total	$1,991,000,000	$9,380,000,000	$10,285,000,000

A HEALTHIER AND LESS COSTLY LIFE: NOT JUST DEFERRING COSTS TO END OF LIFE

The return on investment for community-based disease prevention programs does not just defer high health care costs to the end of life. By increasing physical activity and good nutrition and decreasing smoking and other tobacco use, we are ensuring that more people will be healthier for longer periods of their life.

Being healthier throughout their lifetimes, these individuals might avoid developing complications or compounding conditions that may develop if they are less healthy (e.g., gain too much weight, are physically inactive, or practice poor nutrition).

A recent study by Lakdawalla, Goldman, and Shang in *Health Affairs* demonstrated that obese and non-obese people have similar life expectancies, but the health care costs of an obese person will be significantly higher than a non-obese person over the course of a lifetime. Therefore, higher costs are not offset by reduced longevity. Obese people also have "fewer disability-free life years and experience higher rates of diabetes, hypertension, and heart disease."[6]

As one example, a person who is obese has a higher risk for needing a knee replacement. If obesity is prevented, the need -- and cost -- for a knee replacement may be delayed or avoided altogether.

Also, studies have found that smokers, on average, have significantly higher health care costs than non-smokers, but smokers dying sooner does not save money.[7, 8]

Scientists refer to this effect as "compression of morbidity," which means extending ***healthy*** life expectancy more than total life expectancy. Chronic disease and disability are compressed into a smaller portion of a person's life -- and his or her lifelong health care management costs are lower and quality of life is improved.[9, 10]

DIFFERENT TYPES OF PREVENTION EFFORTS YIELD DIFFERENT RETURNS

A number of studies have examined whether prevention efforts result in cost savings in addition to helping people be healthier. A February 2008 article, "Does Preventive Care Save Money? Health Economics and the Presidential Candidates," in the *New England Journal of Medicine (NEJM)* reviewed a wide range of studies looking at the potential cost-savings for prevention programs and noted that "studies have concluded that preventing illness can in some cases save money but in other cases can add to health care costs."[11]

There are 3 types of prevention: primary, secondary, and tertiary. Primary prevention involves taking action before a problem arises in order to avoid it entirely, rather than treating or alleviating its consequences. Primary prevention can include clinical interventions, such as specific immunizations, and broader public health interventions, such as increasing the availability of fruits and vegetables in neighborhoods; providing safe parks and other recreation spaces; and protection from carcinogens, such as second-hand tobacco smoke.

Secondary prevention is a set of measures used for early detection and prompt intervention to control a problem or disease and minimize the consequences, while tertiary prevention focuses on the reduction of further complications of an existing disease or problem, through treatment and rehabilitation.[12]

Many factors influence whether specific prevention efforts result in cost-savings. For instance, prevention efforts involving direct medical treatment or pharmaceuticals often have higher costs. These tertiary prevention measures are aimed at trying to reverse a condition or prevent it from getting worse. Secondary prevention efforts, which include early detection and prompt intervention to control a problem or disease and minimize the consequences of a disease, are more cost effective if they are targeted to at-risk populations. In addition, the *NEJM* authors acknowledged that there are prevention programs that are not implemented on a wide enough scale to determine whether they could bring about "substantial aggregate improvements in health at an acceptable cost."[13]

The TFAH-Prevention Institute model is based on studies of **strategic low-cost, community-based primary and secondary prevention efforts** that have demonstrated results in lowering disease rates or improving health choices, but do not involve direct medical care.

SECTION 2

Current Health and Economic Costs

"McKinsey & Company projects [starting in] 2008, the average Fortune 500 company will spend as much on health care as they make in profit. How can we possibly compete in the global economy with that kind of burden?"[14]

— Andy Stern, President of the Service Employees International Union (SEIU)

"If we can create a health care plan that contains costs or drives them down, that improves the health of the employee and extends their life, and avoids catastrophic illness and doesn't cost them any more money, why would anyone quarrel with that plan?"[15]

— Steven Burd, Chief Executive Officer of Safeway

General Motors (GM) estimates it pays $1,500 per car produced in health care coverage costs to employees and retirees (more than it pays for steel), and these costs are passed onto the consumer. In addition, GM claims that rising health care costs were a critical factor in the decision to cut 25,000 jobs (a cut that can impact up to 175,000 jobs in other sectors of the economy).[16, 17]

California's future economic well-being is inextricably tied to our health. Helping Californians stay healthier is the best way to drive down health care costs and ensure our workforce is competitive in the global economy.

The skyrocketing costs of health care are hurting the California economy. Health care costs are more than 3 times higher than in 1990 and more than 8 times higher than in 1980.[18]

Poor health is putting our economic security in jeopardy. High health care costs are undermining business profits, causing some companies to relocate jobs overseas where costs are lower and productivity is higher. And if we invest more in keeping Californians healthy, not only will we spare millions of people from needless suffering, we will also save the country billions of dollars.

Right now, however, the state and nation's health care system is set up to focus on treating people once they have a health problem. Some experts describe this as "sick care" instead of health care.

The state will never be able to contain health care costs until we start focusing on how to prevent people from getting sick in the first place, putting an emphasis on improving the choices we make that affect our risk for preventable diseases. Experts widely agree that 3 of the most important factors that influence our health are:

1) Physical activity;

2) Nutrition (including eating foods of high nutritional value and in the right quantities); and

3) Whether or not we smoke.

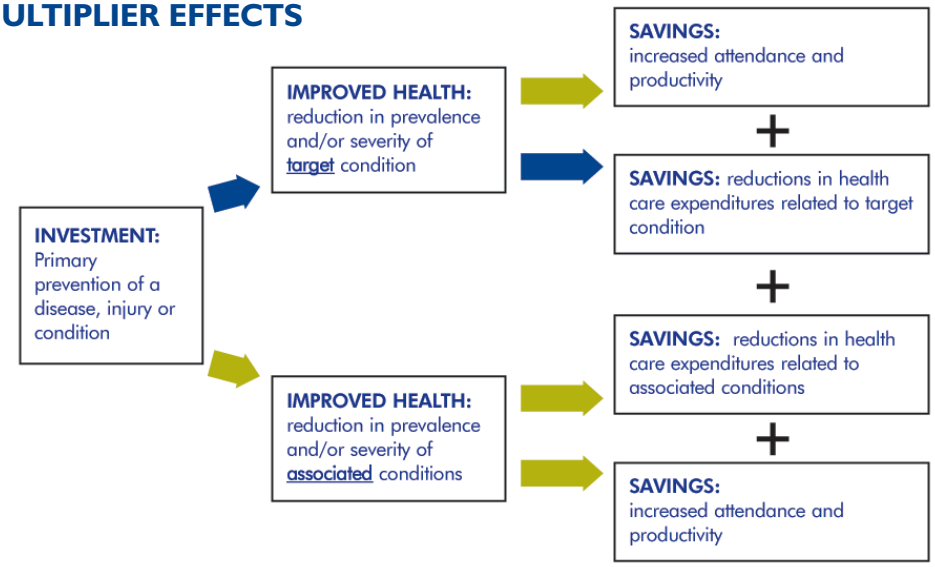
As a state, if we develop strategies and programs that help more Californians become physically active, practice good nutrition, and stop smoking and other tobacco use (while also helping our youth from ever starting smoking or other unhealthy practices), we could have a tremendous payoff both in improving health and reducing health care costs.

STRATEGIC INVESTMENTS IN AT-RISK AREAS CAN YIELD HIGHER RETURNS: THE MULTIPLIER EFFECT

The findings in this report focus on savings within the health care system from a 5 percent reduction in the rates of targeted diseases. The savings from investment in community-based prevention could be much greater due to a *multiplier effect*. First, the community prevention programs can affect not only a *targeted disease* but also *associated diseases*. Tobacco use, for instance, is a factor in conditions that were not included in the model such as asthma, burns, and emphysema. Secondly, there will be savings outside of the health care system, such as increases in worker productivity. For example, smoking-caused productivity losses currently total more than $90 billion per year, not including the losses from smokers taking more sick days than nonsmokers.[19]

Focusing prevention investments on communities with the most frequent and severe health problems could potentially lead to even greater returns. Within California, communities have wide differences in how healthy people are and the level of resources they have available. In communities that have more problems with poor nutrition and physical inactivity and high rates of tobacco use, community-level prevention strategies are likely to have a greater impact and a higher rate of return on investment.

MULTIPLIER EFFECTS



The cumulative benefits of primary prevention:

The blue arrows indicate the customarily studied savings pathway, but investments in primary prevention result in improved health in conditions other than the one targeted and savings accrue in three areas not captured by conventional models.

MAJOR FACTORS IN CALIFORNIA HEALTH: LACK OF PHYSICAL ACTIVITY, POOR NUTRITION, AND SMOKING AND TOBACCO USE

Obesity and smoking put people at significantly higher risk for developing serious and costly diseases. Right now, more than half of Californians live with one or more chronic disease, such as heart disease, stroke, diabetes, or cancer.[20]

Obesity and Overweight

- In California, adult obesity rates have climbed from 15 percent in 1995 to 23 percent in 2007.[21] More than half of the state's adults are overweight or obese.
- More than 13 percent of children in California are obese.[22] One third of children and one quarter of teens are either overweight or obese.[23]

Smoking

- Cigarette smoking is a leading cause of preventable death in California.
- 15.2 percent of California's adults smoke.[24]
- 15.4 percent of California's high school students smoke.[25]
- Rates of high school smokers in California declined from 21.6 percent in 2000 to 13.2 percent in 2004. Similar to national trends, the number of high school smokers in California increased recently. Rates rose from 13.2 percent in 2004 to 15.4 percent in 2006.[26]

The risks of developing heart disease, stroke, and kidney disease are exponentially higher if a person is both obese and a smoker. There are other conditions related to activity, nutrition, and smoking, but combined, these sets of diseases are the most common and costly.

Hypertension and Diabetes

- More than one in 4 -- 27.2 percent -- of California's adults have hypertension.[27]
- 6.1 percent of California's adults has been diagnosed with heart disease.[28]
- 9.1 percent of Californians over 65 years old have been diagnosed as ever having a stroke.[29]
- 7.6 percent of California's adults have diabetes.[30]

Current Physical Activity Trends

- One third of California teenagers do not engage in the recommended level of physical activity (vigorous activity 3 or more times a week).[31]
- Approximately 20 percent of children (ages 2 to 11) and more than 30 percent of California's teens reported watching more than 2 hours of television or video games on a typical weekday.[32]
- Nearly one in 4 -- 23 percent -- of California's adults report they do not engage in any physical activity.[33]
- Only about a third of California's adults who had seen a health care provider in the past year discussed exercise during the visit.[34]
- According to the surgeon general, 60% of American adults do not meet recommended levels for physical activity, according to the Surgeon General.[35]

Current Nutrition Trends

- Less than half of California's children ages 2 to 11 eat the recommended number of fruits and vegetables daily (5 or more servings); 14 percent drink 2 or more cans or glasses of soda or sweetened drinks daily; 28.3 percent eat at least one fast food meal daily; almost one quarter eat 2 or more servings of cookies, candy, doughnuts pastries, cake or popsicles daily.[36]
- Less than a quarter of teens and adults eat the recommended number of fruits and vegetables daily; about 30 percent drink 2 or more cans or glasses of soda or sweetened drinks daily; 43.2 percent eat one or more servings of fast food daily; and about one third eat 2 or more servings of cookies, candy, doughnuts, pastries, cake, or popsicles daily.[37]
- Less than half of California's adults eat the recommended number of fruits and vegetables daily.[38]
- Less than a third of California's adults who visited a health care professional in the past year discussed diet and nutrition during the visit.[39]
- On average, Americans now consume approximately 300 more calories daily than they did in 1985.[40]
- Since the 1980s, sugar and fat consumption has dramatically increased while whole grains and milk consumption has dropped.[41, 42]
- Between 40-80 percent of overweight children will become overweight adults.[43, 44]

Diseases Related to Physical Inactivity and Poor Nutrition

People who do not engage in adequate physical activity, have poor nutrition habits, and/or are obese are at increased risk for type 2 diabetes, high blood pressure (hypertension), heart disease, stroke, kidney disease, some forms of cancer, arthritis, and chronic obstructive pulmonary disease (COPD).[45]

- More than 75 percent of high blood pressure cases can be attributed to obesity.[46]
- Over time, type 2 diabetes and high blood pressure put people at increased risk for developing even more serious conditions, including heart disease, stroke, or kidney disease.
- Other obese or inactive individuals can also develop heart disease, stroke, or kidney disease without first being diabetic or hypertensive.
- Approximately 20 percent of cancer in women and 15 percent of cancer in men can be attributed to obesity.[47]
- Obesity is a known risk factor for the development and progression of knee osteoarthritis and possibly osteoarthritis of other joints. For example, obese adults are up to 4 times more likely to develop knee osteoarthritis than normal weight adults.[48] Among individuals who have received a doctor's diagnosis of arthritis, 68.8 percent are overweight or obese.[49] For every pound of body weight lost, there is a 4-pound reduction in knee joint stress among overweight and obese people with osteoarthritis of the knee.[50]

Financial Costs of Obesity, Physical Inactivity, and Poor Nutrition

- California spent more than $28 billion for health care costs and lost productivity related to physical inactivity, obesity, and overweight in 2005.[51]
- More than one quarter of America's health care costs are related to obesity.[52, 53] Health care costs of obese workers are up to 21 percent higher than non-obese workers.[54] Obese and physically inactive workers also suffer from lower worker productivity, increased absenteeism, and higher workers' compensation claims.[55]
- The government -- using taxpayer dollars -- finance nearly half of all adult obesity medical spending through Medicaid and Medicare.[56]
- If 10 percent of adults became more active and maintained a healthy weight over a five-year period, it could result in nearly $13 billion in savings.[57]

Smoking Trends

- Since the passage of Proposition 99 in California in 1988, the number of adult smokers has decreased from 22.7 percent to 14 percent -- leading to a decline in tobacco-related illnesses, included lung cancer, heart disease, and smoking attributable cancers.[58]
- Despite progress over the past decade, every day more than 1,000 new kids become regular, daily smokers while another 4,000 kids try their first cigarette.[59]

Diseases Related To Smoking

Smoking harms nearly every organ in the body.[60]

- Smoking causes virtually all deaths from lung cancer.
- Smoking is a major cause of heart disease, cerebrovascular disease, chronic bronchitis and emphysema.[61]
- Smoking is a known cause of cancer of the lung, larynx, oral cavity, bladder, pancreas, uterus, cervix, kidney, stomach and esophagus.[62]
- Smoking in pregnancy accounts for an estimated 20 to 30 percent of low-birth weight babies, up to 14 percent of preterm deliveries, and some 10 percent of all infant deaths.[63]

Financial Costs of Smoking

- Smoking costs California nearly $16 billion annually -- $3,331 per smoker.[64]
- Tobacco use costs the U.S. more than $180 billion annually in health care bills and lost productivity.[65] Lifetime health care costs for individuals who smoke are $17,500 higher than for those who do not smoke.[66]

SECTION 3

Examples Of Community-Based Disease Prevention Efforts In California

Every Californian should have the opportunity to be as healthy as he or she can be. But currently, health varies dramatically from community to community.

Access to good medical care is obviously one important factor that impacts how healthy a person is, but a number of factors other than medical care play a role in health.

In fact, many researchers have found that where you live, your income level, your socio-economic group, and behavior often impact your health more than either genetics or access to medical care.[67, 68, 69]

For this study, The New York Academy of Medicine reviewed studies of community-based disease prevention programs and the health impact and costs of these programs. More than 80 studies met the criteria as effective public health interventions, meaning they showed positive results on improving health or positive behavior changes within either an entire community or targeted at-risk communities. For instance:

- Access to walking/jogging paths and other safe recreation spaces has been shown to lead to increased physical activity in communities.[70, 71]
- Tobacco taxes have been shown to result in significant drops in smoking rates, which lead to improved health and lower health care costs. Specifically, research indicates that every 10 percent increase in the real price of cigarettes reduces overall cigarette consumption by approximately 3 to 5 percent, reduces the number of young-adult smokers by 3.5 percent, and reduces the number of kids and pregnant women who smoke by 6 or 7 percent.[72] For example, Texas recently increased its cigarette tax by $1.00 per pack, and consumption over the following year dropped by more than 20 percent.[73]
- Smoke-free laws also have a positive impact on the health of communities with no real cost.[74] The cigarette companies acknowledged the power of smoking restrictions to reduce smoking rates years ago (in internal company documents revealed in anti-smoking lawsuits), stating, for example, that "if our consumers have fewer opportunities to enjoy our products, they will use them less frequently."[75]
- Local zoning laws have been shown to improve the walkability of a community, supporting increased physical activity. For example, in Davis, California, a carefully designed bike network, which includes a dedicated traffic lane for bikers, and a decision by the city to stop busing children to school, having them bike instead, has led to 25 percent of all trips in the city being by bike (compared to one percent nationally)[76]
- Menu labeling at fast food restaurants (showing caloric and nutrition information) can contribute to reducing obesity. One study has suggested that menu labeling in Los Angeles could significantly slow the rate of weight increases in the population, saving health care costs associated with obesity.[77]

- For individuals, a 5 to 10 percent reduction in total weight can lead to positive health benefits, such as reducing risk for type 2 diabetes.[78]
- An increase in physical activity, even without any accompanying weight loss, can mean significant health improvements for many individuals. A physically active lifestyle plays an important role in preventing many chronic diseases, including coronary heart disease, hypertension, and type 2 diabetes.[79, 80, 81, 82]

Examples of Community-Based Disease Prevention Programs in California to Promote Good Nutrition, Increased Physical Activity, and Smoking Prevention

IMPACT OF PROPOSITION 99: CALIFORNIA'S ANTI-SMOKING LEGISLATION[83]

In 1988, the state of California voted to enact Proposition 99, the California Tobacco Tax and Health Promotion Act. Proposition 99 increased the tax on cigarettes and other tobacco products from $0.10 to $0.35. The revenue from the tax was allocated to a variety of health promotion projects including:

- 20 percent allocated to a health education account to create school-based programs discouraging children from smoking;
- 45 percent to hospitals and physicians to provide for patients who cannot afford to pay;
- 5 percent to research;
- 5 percent to parks and recreation; and
- 25 percent to an unallocated account to go to any of the other programs or for fire prevention measures.

Three years after implementation of Proposition 99 researchers found a 9 percent reduction rate in cigarette sales in California and a decrease in the prevalence of cigarette smoking among adults from 26.7 percent in 1988 to 22.2 percent in 1992. This means that the act reduced cigarette consumption by close to 705 million packs between January 1989 and December 1991. A 2001 analysis found that there are "approximately one million fewer smokers in California than would have been expected [and] per capita cigarette consumption has fallen by more than 50 [percent]."[84]

The results of Proposition 99 suggest that placing a tax on certain products and using the revenue from the tax for educational and health programs can have a substantial effect on public health.

HEALTHY EATING, ACTIVE COMMUNITIES (HEAC)[85]

Healthy Eating, Active Communities (HEAC), a program funded by The California Endowment, brings together community residents with local government, community organizations, and private businesses, in an effort to prevent childhood obesity by improving the environment children inhabit. The program, at a cost of approximately $7 annually per capita in the target communities with minimal additional expenses for technical assistance, has already accomplished significant changes in the food and physical activity environments and policies in these communities, including new parks, input into city general plans, healthier food marketing in local stores, healthier foods in hospital, public health department, and public park vending machines, and increased physical activity opportunities in schools and after school programs.

Within 6 California communities HEAC focuses on forming a partnership between a community-based organization, school districts and a public health department to implement strategies to improve nutrition and physical activity environments. In each community the partnership works in 5 sectors including:

- **In Schools** -- by improving the quality of foods sold and available on campus, and advocating for increased compulsory PE for grades K-12, as well as more opportunities for non-competitive physical activity.
- **After School** -- such as improving cooperation with parks and recreation departments.
- **In Neighborhoods** -- improving access to affordable fresh produce, providing safer walkways and parks, and limiting the promotion of unhealthy foods.
- **In the Healthcare Sector** -- HEAC, with the help of Kaiser Permanente, training health care providers to incorporate more prevention and health promotion into clinical practice, and engaging physician champions to advocate for improving access to healthy foods and physical activity.
- **In Marketing and Advertising** -- such as eliminating the marketing of unhealthy products to children in and around schools, and via television, internet and other media.

HEAC aims to effect policy change that will improve environments for healthy eating and active living. Also, in January 2007, HEAC participated in the first California Convergence meeting, which aims to promote statewide improvements in food and parks and other recreation spaces that make it easier to safely engage in physical activity.

Chula Vista, California: South Bay Partnership -- Chula Vista Community Collaborative

The Chula Vista Community Collaborative (CVCC), located in Chula Vista, California, is a group of community-based organizations, government agencies, school districts, advocates, and policymakers, funded through HEAC to improve the food and physical activity environments of school-age children. Within each of the sectors described above, CVCC works to change policies and practices around food and physical activity with the goal of preventing child obesity. Some of CVCC's accomplishments include:

- Implementing 100 percent healthy vending in all City public vending machines.
- Instituting a breast-feeding support policy at all City work sites.
- Creation of a Healthy Community Task Force between the City and HEAC partners to address policies leading to environmental changes that contribute to a healthy community.
- Working with school and after-school program foodservice to provide students with an array of healthy food choices.
- Hiring a physical education teacher to train elementary school teachers on effective ways to provide physical education to students.
- Participation on the City of Chula Vista Redevelopment Advisory Committee to provide public health recommendations related to development applications.

Boyle Heights, California: The Evergreen Cemetery Jogging Path

In Boyle Heights, California, a small, densely populated urban community east of downtown Los Angeles, the Evergreen Jogging Path Coalition (EJPC) has successfully worked to create an outdoor fitness area that promotes health by encouraging physical activity among community residents. The Coalition, comprised of neighborhood residents and community activists, worked closely with city officials to transform a cracked sidewalk that ringed the neighborhood's centrally located Evergreen Cemetery into a 1.5 mile continuous rubberized jogging path. The path became the first public sidewalk in the country to be designated a recreational public space.

The EJPC's collaborative efforts demonstrate that even where open space is limited, existing sidewalks can provide space for recreational physical activity. The Coalition estimates that since the path was built, daily use has increased from about 200 to more than 1,000 people who use the path for jogging, walking, and socializing.

San Francisco, California: The Good Neighbor Project

The low-income, predominantly African-American, 33,000 person neighborhood of Bayview-Hunters Point in San Francisco does not have a supermarket. A youth-led local non-profit called the Youth Envision Program led by Literacy for Environmental Justice (LEJ) began an effort -- the Good Neighbor Project -- to increase access to fresh produce. They found that neighborhood retail establishments only devoted 2 to 5 percent of their shelf space to fresh produce. They worked with one pilot store to bring sales of fresh fruits and vegetables to 30 percent of the store's overall sales. After that, they recruited public and private support and collaborated with the city's Redevelopment Agency to create an incentive program for area merchants that transformed 10 to 20 percent of their shelf space to fresh produce.

The Good Neighbor Project has expanded to offer qualifying neighborhood merchants incentives for helping to promote healthy nutritious products and reduce smoking and alcohol sales, including in-store energy efficiency retrofits, local advertising, business training, cooperative buying, in-store promotions, and participation in a branding campaign. In turn, the merchants must agree to minimum produce stocking requirements, remove the majority of tobacco and alcohol advertising, and maintain a clean appearance. The Good Neighbor Project is continuing to work with its initial pilot store and is reviewing 5 additional proposals.

GOVERNOR'S ACTION SUMMIT ON HEALTH, NUTRITION, AND OBESITY

On September 15, 2005 Governor Arnold Schwarzenegger held the Governor's Action Summit on Health, Nutrition, and Obesity and became the first California Governor to make promoting healthy eating and physical activity a high priority. Governor Schwarzenegger challenged "leaders in government, business, education, medicine and parenting to continue the work we have begun today to make California the nation's model for health, nutrition and fitness."

At the Summit the Governor unveiled the Governor's Vision for a Healthy California. The vision called for Californians to take individual responsibility and also provided a series of recommendations for communities and businesses. It included calling for marketing only healthy foods to children under age 12 and supporting neighborhoods to provide affordable, safe, and convenient access to healthy foods options and recreational and physical activity spaces.

A Vision for California -- 10 Steps Toward Healthy Living

1. Californians will understand the importance of physical activity and healthy eating, and they will make healthier choices based on their understanding.
2. Everyday, every child will participate in physical activities.
3. California's adults will be physically active everyday.
4. Schools will only offer healthy foods and beverages to students.
5. Only healthy foods and beverages will be marketed to children ages 12 and under.
6. Produce and other fresh, healthy food items will be affordable and available in all neighborhoods.
7. Neighborhoods, communities and buildings will support physical activity, including safe walking, stair climbing, and bicycling.
8. Healthy foods and beverages will be accessible, affordable, and promoted in grocery stores, restaurants, and entertainment venues.
9. Health insurers and health care providers will promote physical activity and healthy eating.
10. Employees will have access to physical activity and healthy food options

Some reported progress since the 2005 Summit includes:

- **Junk food out of schools.** The Governor signed legislation to limit junk food and soda sales and eliminate the use of trans fat in California schools and authorized $3 million in one-time funding for School Breakfast Startup grants.
- **Time to play ball.** Due in large part to the Governor's support, the 2006-07 California Budget Act included $40 million in new ongoing incentive grant funding for schools to hire additional credentialed physical education teachers at the elementary and middle school levels. Additionally, the budget established a one-time block grant for the purchase of arts, music, and physical education supplies and equipment.
- **Healthier choices at restaurants.** The Governor signed 2 pieces of legislation in 2008 making California the first state in the nation to require calorie information on menus and menu boards at chain restaurants and to outlaw the use of trans fat at bakeries and restaurants.
- **Local government creates healthy environments.** A number of cities and counties have passed policies to support healthy vending, healthy meal options, and physical activity in worksites and facilities serving community residents.

Central and San Bernardino Valley: Save the Children

Recent studies have found that rural children are just as likely to be obese as urban children, and 21 percent of rural children live in poverty compared to 18 percent of urban children.[86, 87, 88, 89, 90] According to Save the Children, a leading independent organization promoting children's health and well-being, "children who live in poverty have a greater challenge engaging healthy lifestyle behaviors to support normal growth and development."[91] One challenge is lack of access to healthy foods, beverages and meals. A 2007 study found more than 800 counties where rural residents live 10 miles from a large food retailer.[92] Poverty and food insecurity are only 2 factors behind the high rates of childhood obesity in rural areas. In addition, children living in rural areas struggle with a lack of resources and infrastructure to support physical activity and healthy eating.[93]

According to the National Survey on Children's Health:

- 31.5 percent of rural children aged 10 to 17 years old were overweight or obese, compared to 30.4 percent of urban children;
- 25.4 percent of rural children failed to meet physical activity recommendations;
- 40.7 percent of rural children did not participate in any after school sports teams or activities;
- Nearly half of rural children (48 percent) spent at least 2 hours a day with electronic entertainment media (TV viewing, video games, computer use);
- One-half of the children in California did not participate in afterschool sports; and
- Nearly one-half of children in California had physically inactive mothers.

In order to help address the issue of rural childhood obesity, in 2005 Save the Children launched the CHANGE (Creating Healthy, Active, and Nurturing Growing-up Environments) Program, which is designed to increase rural children's access to daily physical activity and a healthy snack. The CHANGE Program operates in 5 rural regions of the U.S. where poverty rates are highest, including California's Central and San Bernardino Valley. During the 2007-2008 school year, the CHANGE Program served nearly 7,000 children at 95 sites in 12 states. A large-scale community-based intervention is underway called the CHANGE Study, which is adapting and testing Tufts University's Shape Up Somerville model. The research will identify a package of interventions to reduce rural children's obesity risk and create environments that support healthy lifestyle behaviors. Results are expected in 2010.

Recommendations and Conclusions

SECTION 4

While many important disease prevention programs are already in place in California, they are currently too limited to have a substantial impact on improving the health of Californians enough to reduce health care costs. To truly turn the tide in an epidemic of chronic diseases, we must be committed to making over our communities so that healthy choices become easy choices for all Californians.

Prevention has been systematically underfunded -- and for the limited existing programs, funding has not been sustained long enough to realize the potential return. Until the state makes a more substantial investment in proven disease prevention programs, we will not realize the potential savings. We need to make the investment to see the returns.

For California to become a healthier state, prevention must become a driving force in our health care strategy and become central to discussions about how to reform health care in the state. For too long, disease prevention has been considered too difficult to implement programs on a wide-scale basis.

One challenge has been to get policymakers to invest, given the already high health care costs and difficulties in showing the impact of many community-based prevention programs. Understanding the return on investment is an important step to help determine what types of programs to invest in, how much should be invested, and how the programs could be funded.

The *Prevention for a Healthier America California* study identified a range of community-based programs that have been shown to have a positive impact on improving the health of communities by increasing physical activity, improving nutrition, or preventing or helping people quit smoking. These programs are designed to help improve the health and well-being of large segments of the population without direct medical treatment. Instead, community disease rates are decreasing and health is improving through increased access to safe places to be active, affordable nutritious foods, and support to help prevent or quit smoking.

For community-based disease prevention efforts to work, there must be 1) a reliable funding stream that includes investment from payers who stand to benefit from savings; and 2) state policies in place that will ensure the benefit of prevention programs will be maximized, including government-wide coordination and consistency in policy making.

The following are some actions that California policymakers could take to help make disease prevention a higher priority in the state and to help reduce health care costs by making a sustained investment toward keeping Californians healthier:

Invest in Prevention

It is increasingly clear that prevention makes good policy. Yet, too often, because public budgets remain in crisis mode and the pay off from prevention comes 2 or 5 or 10 years down the road, prevention rarely rises to the level of urgency to be adequately funded.

- **Increase investment in prevention and index to health care costs:.** In order to achieve the kind of health care savings described in this report, the state must increase its investment in public health programs. One way to assure that prevention investments are not subject to the vagaries of the annual budget process is to "index prevention" funding to overall increases in health care spending in the state. This would assure a sustained investment in prevention.

- **Create Surcharges on Health Care Funding Mechanisms:** Private insurers, not just government-financed programs such as Medicare and Medicaid, benefit from investments in prevention that can reduce chronic disease costs. New mechanisms should be explored to engage private insurers to contribute in some way to community-level public health interventions. A surcharge could be placed on employer-sponsored insurance, which could be waived if insurers agree to a "prevention investment package" consisting of:

  - First dollar coverage for all recommended prevention services, including immunization and screening;
  - Contributions (amount determined by insurer size) to local community based prevention efforts (such as a local wellness trust);
  - Employee wellness program (meeting best practice standard) offered free to all companies they insure and to their workers.

Increase Flexibility in Existing Funding Streams

There are opportunities to utilize existing funding more efficiently for community-level prevention. For example:

- The state could work with the U.S. Centers for Disease Control and Prevention (CDC) to channel the multiple, disease-specific funding streams coming from the CDC into a combined program that emphasizes community makeovers and community-level prevention, with a special focus on communities with the greatest need.

- The state could, using state dollars, work with its managed care contractors to promote investment in community-level prevention, recognizing that this kind of investment, especially in high-risk communities, will result in cost-savings to the MediCal program. The state should also explore with the federal government options for supporting such investment with inclusion of the federal match, perhaps with a particular focus on dual eligibles, since chronic disease costs are often highest among the elderly.

- The state could work with the federal government to develop a partnership between the Department of Public Health and the Medicare program to develop community-level interventions targeting the 55-64 age group to assure that this cohort enters the Medicare program as healthy as possible. Since Medicare would reap the financial rewards, the federal government should provide funding to the state for this program.

- The state could work to assure that both state and federal funding streams outside public health -- such as transportation and redevelopment funds -- are used on projects that have clear community health benefits.

Create a Wellness Trust to Collect, Manage, and Expend Prevention Funding

As this report outlines, investment in prevention will result in significant savings for public and private health insurers and payers. It follows that those who will ultimately benefit should contribute to the prevention effort. A Wellness Trust could assure clinical and community prevention to all, not just the insured -- by tapping MediCal and private payers as well as some existing public health resources. The Trust's board would be comprised of the multiple stakeholders benefiting from prevention and contributing to its funding. The formulas for investment and management structure of the Trust would need to be carefully designed in consultation with both public and private stakeholders. After the initial investment, future reinvestments could potentially be drawn against savings in different sectors. The fund would likely need to function as a statewide entity, disbursing funding for initiatives such as community makeover programs at the local level. Community trusts could be set up to handle Wellness Trust funds and to ensure community input on Community Makeover implementation.

Create a Cabinet-level Committee Accountable for Achieving Health Impacts

The Governor should create a Cabinet-level committee, chaired by the Secretary of the Health and Human Services Agency and with representation from all relevant cabinet departments, which would be charged with assuring a statewide approach to prevention by:

- Identifying major state-level programs that affect community health and determining baseline funding for prevention at the state and local levels.
- Establishing procedures to assure coordination for resource allocation and funding strategies in all cabinet agencies with regard to prevention.
- Reducing regulatory and other barriers to community-level prevention.
- Establishing performance based evaluation and benchmarks for each major agency to ensure accountability for advancing overarching health objectives (see the following section on a statewide accountability plan).
- Coordinating activities and priorities with the California Conference of Local Health Officers.
- Focusing on workplace health issues, to assure that the state, as an employer and funder, assures that all the workplace maintains, supports and encourages health.

Develop a Statewide Accountability Plan

A wide variety of policy decisions – ranging from the location of a new housing development or factory to transportation priorities – can affect the public's health. It is important to assess potential impacts before such policy decisions are finalized. As part of its charge, the Governor's cabinet-level committee should be responsible for developing a health improvement review process for all relevant government programs so that all new projects and programs are assessed for their ability to improve the community's health.

Just as importantly, as investment is increased in community-level prevention, we must assure that we measure the effectiveness of prevention actions and expenditures. The Governor's Cabinet-level committee should adopt indicators and prepare for public dissemination report cards that measure the effectiveness of such decisions. A potential element of a statewide accountability plan would be a set of Children's Community Health Indicators. Children are often the most vulnerable members of a population but also the best prevention investment in terms of lifelong health. If the health status of children within California were to improve dramatically, the overall picture of physical and economic health would similarly progress.

Explore Investment Strategies and Structural Changes on the County and Regional Level

Support for community-level prevention is needed at all levels: statewide, regional, and local. The scale and effect are greater for implementation at the state level, but the opportunity to move quickly and innovate could be greater at the local level. Many of the strategies discussed here could be modified to be implemented locally, creating evidence of effectiveness and building momentum for broader statewide action. Local efforts are more effective with state support and endorsement.

Methodology

APPENDIX A

The Prevention for a Healthier America study was based on a:

A) Literature Review of Community-Based Prevention Studies; and

B) Return on Investment Model

A. LITERATURE REVIEW

In order to identify effective community-based disease prevention programs and the results and costs of these programs, TFAH consulted with NYAM to conduct a comprehensive literature review. Overall, the literature review identified 84 studies that met the criteria as effective "public health interventions." These interventions included both community-based programs and policy changes. The studies focused on how programs or policy changes resulted in improved health or positive behavior changes within either an entire community or a particular at-risk targeted community. They did not include medical interventions, such as pharmaceutical or doctor/clinic-based studies.

Overall, however, the researchers found the literature evaluating community-based disease prevention programs to be limited, and outcomes were not reported in a standardized way. In the review, no studies directly included information about all of the areas modeled for this project, which include: the expenses of diseases, a community-based disease prevention program, data on the impact of interventions on diseases over time, and the per capita cost of implementing the program. Experts at NYAM and the Urban Institute developed a composite based on the available data reported in the literature to derive assumptions for costs and health impacts.

Accordingly, TFAH calls for increased evidence-based research into community-based disease prevention programs that explicitly include information about the impact of interventions on diseases over time and the costs for the programs. This type of research would help policymakers better determine how to effectively invest in public health programs and assist those in the field in determining the potential cost of identified programs.

BACKGROUND ON LITERATURE REVIEW

The full bibliography of the literature review is available in Appendix B. The studies included in the literature review had to meet the following criteria:

1. Report on a community-based public health program that showed results on improving health or behavior change related to the 8 diseases most impacted by physical activity, nutrition, and smoking (type 2 diabetes, high blood pressure, heart disease, kidney disease, stroke, some forms of cancer, COPD, and arthritis);
2. Meet a threshold for scientific study design and likelihood the study could be replicated; and
3. Not involve direct health care services, be provider driven, or be conducted in a health care setting.

The researchers narrowed down more than 300 peer reviewed journal articles and study descriptions to the 84 that were included in the review.

- To find the studies, the researchers searched the MEDLINE database via PubMed of studies from 1975 to 2008 and interviewed public health experts.[94]
- When specific needed data was not included in studies, the researchers contacted study authors directly when possible to ask them about disease rate changes, behavior changes, or cost data.
- Study designs had to be: A) randomized controlled studies; B) quasi-experimental studies without obvious selection bias; or C) pre-post studies with no comparison group, or comparison groups with likely selection bias.[95] Studies that did not meet these criteria were eliminated.

A majority of the 84 studies looked at programs that addressed a number of related health factors, such as weight, nutrition, and physical activity. Researchers often call these studies "multifactorial." Eleven of the studies examined mass media or social marketing campaigns. Six of the studies focused on intensive counseling to support lifestyle changes. One study focused on the impact of a cigarette tax in reducing smoking. Two studies examined employer-based health promotion efforts.

While this study focuses on health care costs of adults, a number of the interventions are targeted at improving the health of children. These studies were included because these interventions improve the health of children as they enter into the adult population, and a number of the studies have found that programs targeting children also often have an impact on improving the health of their parents and caregivers.

There are many other disease prevention efforts that may be effective or show promise that may not be part of model because they did not meet all of the criteria for inclusion.

B. RETURN ON INVESTMENT MODEL

The Urban Institute researchers developed a model to estimate how investing in community-based disease prevention could lead to lower health care costs. This model is based on the literature review led by NYAM and data on disease rates and associated medical expenditures. The model addressed 3 questions:

1. How much do people with selected preventable diseases spend on medical care?
2. If the rates of these conditions were reduced, how much of these expenditures could be saved?
3. How would these savings be distributed across payers?

Based on the review of the literature, the researchers considered 1) the costs of the most expensive diseases related to physical inactivity, poor nutrition, and smoking; 2) program cost assumptions; 3) disease rate reduction assumptions; 4) cost savings estimates; and 5) limitations and notes about the model.

The model is used to compare costs of a given intervention with its expected effects on medical care expenditures to assess the potential return on investment in community-based disease prevention programs. As an example of potential return, the model looks at an investment of $10 per person per year for successful community-based disease prevention programs related to improving physical inactivity and nutrition, and preventing smoking and other tobacco use. Based on findings reported in the literature, the researchers assumed that such strategic interventions could reduce uncomplicated diabetes and high blood pressure rates by 5 percent in one to 2 years; heart, stroke, and kidney disease by 5 percent within 5 years, and cancer, arthritis, and COPD by 2.5 percent within 10 to 20 years.

1. Current Costs of Most Expensive Diseases: The researchers at NYAM and the Urban Institute determined the most expensive set of diseases that have shown potential to be reduced through physical activity, nutrition, and smoking interventions. These include: heart disease, selected types of cancers, selected lung diseases, diabetes, hypertension, heart disease, stroke, arthritis, and kidney disease. None of these diseases can be prevented entirely; some individuals develop these conditions due to genetics or other factors unrelated to activity, nutrition, or smoking.

The study relies on a 2004 *Health Affairs* study by Thorpe, et. al. to determine the most expensive diseases, and then a review by NYAM of the literature to determine which of the most expensive diseases respond to physical activity, nutrition, and smoking interventions.[96]

The Urban Institute used data from the Medical Expenditure Panel Survey (MEPS) from 2003 to 2005 (adults only, excluding people in nursing homes or other institutions) to estimate the health care costs of the diseases nationally.

Based on the literature review and consultation with a medical advisor, the diseases were grouped into categories, using 3 broad groups of conditions: 1) uncomplicated diabetes and/or high blood pressure 2) diabetes and/or high blood pressure with complications (heart disease, stroke, and/or kidney disease); and 3) selected cancers (those amenable to community-based prevention), arthritis, and chronic obstructive pulmonary disease (COPD).

DISEASE GROUPINGS USED IN THE MODEL

- Uncomplicated Diabetes and/or High Blood Pressure
  - Diabetes alone
  - High blood pressure alone
  - Diabetes and high blood pressure
- Complicated Diabetes and/or High Blood Pressure
  - Diabetes with heart disease, kidney disease, and/or stroke
  - High blood pressure with heart disease, kidney disease and/or stroke
- Non-diabetic, Non-hypertensive Heart Disease, Kidney Disease, and/or Stroke
- Cancer
- Arthritis
- COPD

FINANCIAL BURDEN OF SPECIFIC DISEASES

The Urban Institute researchers conducted regression analyses to estimate the percent of health care costs attributable to each disease group. Diabetes, high blood pressure, heart disease, stroke, kidney disease, cancer, arthritis, and COPD account for almost 38 percent of America's health care costs. Significant numbers of cases of these diseases could be prevented or delayed with increases in physical activity, good nutrition, and smoking cessation.

Percent of U.S. Health Care Costs By Top Diseases That Can Be Impacted By Physical Activity, Nutrition, and Smoking
(Based on current disease rates, including all insurance payers, does not include people in institutionalized care)

Health Conditions	Percent of Health Care Costs in the U.S.
Diabetes, high blood pressure, or a combination of the 2 diseases	9.4 percent
Diabetes or high blood pressure who also have heart disease or stroke and/or kidney disease	16.0 percent
Heart disease or stroke and/or kidney disease who do not have diabetes or high blood pressure	6.2 percent
Cancer	3.1 percent
Arthritis	1.1 percent
COPD	2.0 percent

Source: Urban Institute calculations using data from the 2003-2005 Medical Expenditure Panel Survey (MEPS)

2. Building Estimates for Costs of Programs: Of the studies that outlined potential costs or where project staff contacted researchers to determine costs, most had costs estimated to be in the range of $3-$8 per person.

- A few programs were found where costs exceeded $10. Those identified were primarily interventions that focused on intensive coaching and one-on-one or small group counseling where administrative costs were higher and evaluations and measurements were intensive.

In order to determine an estimate, in addition to reviewing the available literature, NYAM and TFAH consulted a set of experts who agreed that $10 is a high, and therefore, a conservative assumption for the costs of community-based programs.

Sample Interventions				
Study	**Target Condition(s)**	**Intervention Information**	**Intervention Effect**	**Population and Age**
Carleton (1995)	Cardiovascular Disease (CVD), Coronary Heart Disease (CHD), Stroke	Mass media campaign, community programs aimed at 71,000 people. Intervention population randomly generated, compared to a reference community. Cost: $15 per person per year.	At 5 years: Risk for both CVD and CHD down 16 percent	2,925 men and women 18-64 [control (1,665); intervention (1,260)]
Farquhar (1990)	CVD, CHD, Stroke	Mass media campaign, community programs aimed at 122,800 people. Intervention population randomly generated, compared to a reference community. The organizational and educational program was delivered at a per capita cost of about $4 per year.	At 5 years: CHD risk down 16 percent; CVD mortality risk down 15 percent; Prevalence of smoking down 13 percent; Blood pressure down 4 percent; Pulse down 3 percent; Cholesterol down 2 percent.	971 men and women 25-74 [control (480); intervention (491)]
Fichtenberg (2000)	CVD, CHD, Stroke	Cigarette tax: $0.25 increase on the price of cigarettes with $0.05 of the net tax for an antitobacco educational campaign.	At 3 Years: CHD mortality down 2.93 deaths/yr/100,000 population per year; Amount smoked down 2.72 packs/person/yr.	California population
Gutzwiller (1985)	CVD	Mass media campaign, community programs aimed at 56,000 people. Intervention population randomly generated, compared to a reference community. Cost: $10 per year per adult over the age of 16.	At 4 years: amount of tobacco grams/day decreased 8 percent; 11 percent fewer people smoked.	2,206 men and women 16-69 [control (1,358); intervention (848)]
	CVD, CHD, Stroke	Mass media campaign, community programs aimed at 56,000 people. Intervention population randomly generated, compared to a reference community. Cost: $10 per year per adult over the age of 16.	At 4 years: Hypertension down 7 percent.	481 men and women 16-69 with hypertension (>160/95 mm Hg) [control (117); intervention (364)]
Haines, et. al. (2007)	CVD, CHD, Stroke	12-week employee walking program on a college campus. No cost information available, but such programs are extremely low cost and often have positive ROIs.	At 3 months: 1 percent decrease in BMI; 3.4 percent decrease in hypertension; 3 percent decrease in cholesterol; 5.5 percent decrease in glucose	60 women in their forties

Sample Interventions				
Study	**Target Condition(s)**	**Intervention Information**	**Intervention Effect**	**Population and Age**
Herman (2008)	CVD, Nutrition	Improving access to fruits and vegetables among women who enrolled for postpartum services at 3 Women, Infants, and Children program (WIC) sites in Los Angeles. Participants were assigned either to an intervention (farmers' market or supermarket, both with redeemable food vouchers) or control condition (a minimal nonfood incentive). Interventions were carried out for 6 months, and participants' diets were followed for an additional 6 months. No cost information, but minimal administrative costs to assign and track participation.	At 6 months: +1.4 servings per 4,186 kJ (1,000 kcal) of fruits and vegetables	451 low income minority women 18 years and older [control (143); intervention (308)]
Osler and Jespersen (1993)	CVD	Mass media campaign, community programs aimed at 8,000 people. Intervention population randomly generated and compared to a reference community. Cost: $6 per capita.	At year one: 39 percent eating less fat; 10 percent decrease in smoking; 28 percent increase in physical activity.	1,196 men and women 20-65 [control (629); intervention (567)]
Prior (2005)	CVD	Worksite health promotion, 15 minute cardiovascular risk factor screening, individualized counseling to high-risk employees. Cost: $20 per employee (note this is a high risk population).	At 3.7 years: 12.6 percent decrease in amount smoked; 3.3 percent decrease in diastolic BP; 7.8 percent decrease in cholesterol.	808 high-risk smokers 16-76 years old
Rossouw (1993)	CVD	Mass media campaign, community programs aimed at 122,800 people. Intervention population randomly generated, compared to a reference community (separate high risk group also). Cost: $5-$22 per capita.	At 4 years: Men decreased tobacco intake per day by 0.7 percent, women by 0.3 percent; Men decreased smoking prevalence by 1.1 percent, women by 2.5 percent; Men decreased diastolic BP by 2.5 percent, women by 3 percent; Men decreased systolic BP by 2.5 percent, women by 3.0 percent. High risk at 4 years: Men decreased tobacco intake per day by one percent, women by 0.8 percent; Men decreased smoking prevalence by 2 percent, women by 8.2 percent; Men decreased diastolic BP by 3 percent, women by 2.8 percent; Men decreased systolic BP by 1.3 percent, women by 1.7 percent.	4,087 men and women 15-64 [control (1305); intervention (2,782; high risk; 1,198 (43 percent)]

Sample Interventions				
Study	**Target Condition(s)**	**Intervention Information**	**Intervention Effect**	**Population and Age**
Economos, et. al. (2007)	Nutrition, Physical activity	"Shape Up Somerville" -- comprehensive effort to prevent obesity in high-risk children in first to third grade in Somerville, MA. Improved nutrition in schools, health curriculum, after-school curriculum, parent and community outreach, worked with community restaurants, school nurse education, safe routes to school program. Cost: Between $3-$4 per person.	After one year, on average the program reduced one pound of weight gain over 8 months for an 8 year old child.	First to third grade children in Somerville
EPODE (2004)	Nutrition	Multisectorial 5-year plan involving parents and families, medical providers, school nurses, teachers, towns, businesses, and media campaigns. Estimated cost: Approximately 2 Euros ($3.17 USD) per person.	Obesity has at least remained consistent in targeted towns while it doubled in control areas. Mothers have reported weight loss as well.	5-12 year olds in 10 towns in France
Jenum, et. al. (2006)	Physical activity	Provided information through leaflets and mass media, individual counseling, walking groups, and increased accessible areas for safe recreation. Estimated cost of 0.59 Euros ($0.93 US dollars) per person	After 3 years, compared to the control group, the intervention group had an 8-9 percent increase in physical activity, 14 percent fewer individuals gained weight, 3 percent more quit smoking, and significant decreases in blood pressure rates were reported.	Low-income adults in Oslo, Norway
Hu et al (1994)	Smoking cessation	California Proposition 99 -- increased taxes on cigarettes and other tobacco products from 10 cents to 35 cents.	After 3 years, cigarette sales dropped 9 percent and smoking among adults decreased from 26.7 percent in 1988 to 22.2 percent in 1992.	Population of California

3. Building Disease Rate Reduction Assumptions: Based on findings from the literature review and consultations with a physician, the Urban Institute researchers made assumptions about the length of time it could take for community-based disease prevention programs focusing on increasing physical activity, improving nutrition, and reducing smoking to have an impact on health.

Building on estimates from a range of studies, the researchers modeled an investment of only $10 per person into effective programs to increase physical activity and good nutrition and prevent smoking, and a reduction in rates of uncomplicated diabetes and high blood pressure of 5 percent in one to 2 years; complicated diabetes and high blood pressure as well as non-diabetic, non-hypertensive heart disease, stroke and/or kidney disease of 5 percent within 5 years; and cancer, arthritis, and COPD of 2.5 percent within 10 to 20 years.

In order to determine the effect on diseases, the researchers translated the results of programs as presented in articles into the effect these changes could have on diseases or limiting disease progression. The literature outlines the connections between changes

in behavior and the impact on health. For instance, increased physical activity, reduced Body Mass Index (BMI), or lowering systolic blood pressure have been shown to delay or prevent types of disease development. In addition, studies describe how different diseases progress. Results can be seen in reducing type 2 diabetes, for example, in just one to 2 years. This reduction would inevitably have an effect on the complications of diabetes, most notably heart disease, kidney disease, and stroke, although reductions or delays in these conditions would take longer to be realized than reductions in uncomplicated diabetes or high blood pressure (an estimated 5 years as opposed to one to 2 years). Cancers, arthritis, and COPD would take the longest to be affected, taking 10 to 20 years before disease prevention programs could help bring about reductions in disease rates. The model assumes a one-time reduction in diabetes and/or high blood pressure, even though the sustained investment in prevention programs included in the model could likely result in greater declines. The researchers acknowledge that all of these diseases may develop unrelated to physical inactivity, poor nutrition, or smoking. The model focuses on the estimated share of these disease rates that could be affected by these factors.

Examples of Studies Showing Intervention Impact on Disease or Behavior Rates

Study	Target Behavior	Target Condition	Finding
Brownson (2000)	Physical Activity	Cardiovascular Disease	Of people who had access to walking trails, 38.3 percent used them. Of these users, 55.2 percent increased their amount of walking.
CDC (2005)	Physical Activity, Weight Loss	Diabetes	By losing 5 to 7 percent of body weight and getting just 2 1/2 hours of physical activity a week, people with pre-diabetes can cut their risk for developing type 2 diabetes by about 60 percent.
Dauchet (2005)	Nutrition	Cerebrovascular Disease	Risk of stroke was decreased by 11 percent for each additional portion per day of fruit and 3 percent for each additional portion per day of vegetables.
Felson (1997)	Weight Loss	Arthritis	40 percent increase in risk per 10-lb weight gain and 60 percent increase in risk per 5-unit BMI increase.
HHS (2003)	Nutrition	Cardiovascular Disease, Cholesterol	A 10 percent decrease in cholesterol levels may result in an estimated 30 percent reduction in the incidence of coronary heart disease.
Joshipura, et. al. (2001)	Nutrition	Cardiovascular Disease	Each additional serving of fruits or vegetables per day was associated with a 4 percent lower risk for coronary heart disease.
McGinnis & Foege (1993)	Nutrition	Cardiovascular Disease	22 to 30 percent of CHD deaths are due to dietary factors, especially increased consumption of cholesterol and saturated fat and a decreased consumption of fiber.
	Nutrition	Cancer	The proportion of all cancer deaths attributable to diet is 35 percent.
	Nutrition	Diabetes	45 percent of diagnosed cases are due to poor diet, inactivity, and obesity.
Nanchahal (2005)	Weight Loss	CVD	Every kilogram of weight gain after high school increased risk of congenital heart disease by 3.1 percent in men.
Hamman (2006)	Weight Loss	Diabetes	16 percent reduction in diabetes risk per kilogram of weight lost.

4. Cost Savings Estimates: Using the share of costs estimated in the regression analyses and the size of the effects of prevention programs reported in the literature, the Urban Institute researchers estimated the medical care expenditure savings that would result from implementation of such an intervention. They then applied this formula to the example of a program that reduces the prevalence of uncomplicated diabetes and high blood pressure by 5 percent in the short run (one to 2 years).

Medical Savings Calculations

The savings (S) from reduction of condition j:

$S_j = (e_j) * (\text{share of costs}_j) * \text{expenditures}$

Where:

S_j is savings from the intervention

e_j is the effect of the intervention on disease cluster j

Share of costs refers to estimated costs attributable to disease cluster j

Expenditures is total medical expenses

Short Run Savings Example
(Preliminary Estimates)

The savings from 5% reduction in uncomplicated diabetes and hypertension in the U.S.:

$S_{diab\_HBP} = (e_{diab\_HBP}) * (\text{share of costs}_{diab\_HBP}) * \text{expenditures}_{US}$

$= (0.05) * (0.094) * \$1{,}235 \text{ billion}$

$= \$5.8 \text{ billion annually}$

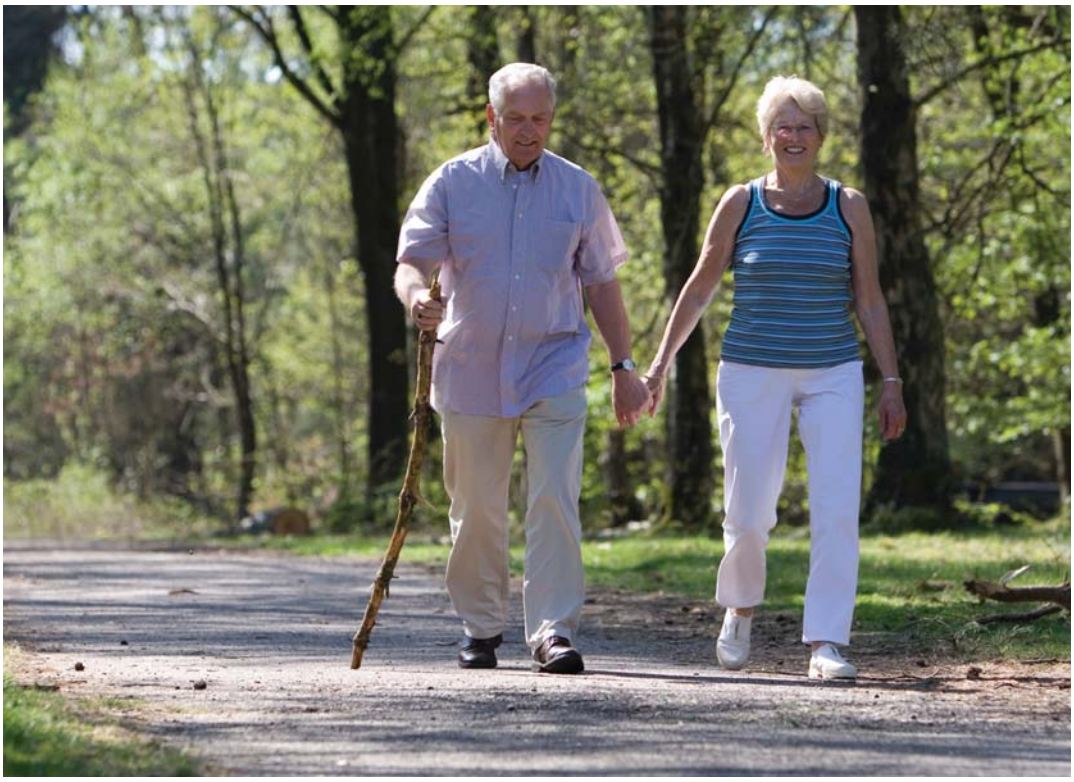
Because the model is based on adults only and excludes nursing home expenditures, the expenditure number used in this example excludes spending on nursing homes and is adjusted to account for spending on children.

5. Limitations and Notes on the Model The researchers note that the estimates are likely to be conservative. As noted above, the model assumes costs in the higher range and benefits in the low range. Furthermore, the model does not take into account any costs of institutional care. Chronic disease often leads to disability or frailty that may necessitate nursing home care, so exclusion of these costs may underestimate the return on investment in reduction of disease.

While the model is still being elaborated to address many of these issues, some known limitations of the model as reported here include:

- The model assumes a sustained reduction in the prevalence of diabetes and hypertension over time. The literature on the duration of the effects of intervention is small, with effects usually reported over no more than 3 to 5 years.
- The model assumes a steady state population. This model is based on current disease prevalence and does not take into account trends in prevalence. For example, diabetes is increasing while heart disease is declining, but the model estimates savings based on the current prevalence.
- While the model does take into account competing morbidity risks, it does not take into account changes in mortality. However, in the short (one to 2 years) and medium run (5 years), changes in mortality are likely to be small.
- The model calculates all savings in 2004 dollars. Thus, it does not take into account any rise in medical care expenditures or changes in medical technology.
- The model incorporates only the marginal cost of the interventions and does not reflect the cost of the basic infrastructure required to implement such programs.
- The intervention effects do not account for variations in community demographics such as distribution of race/ethnicity, age, gender, geography, or income. The intervention effect is treated as constant across groups.

While different disease prevalence in populations covered by different payers or in different states is reflected in the estimate of cost savings, this iteration of the model does not take variations in prevalence into account specifically.



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Diseases:
The researchers searched for the following chronic diseases, cancers, and infectious diseases:
Cardiovascular Diseases, Diabetes Mellitus, Cerebrovascular Disorders, Coronary Disease, Brain Ischemia, Heart Diseases, Chronic Obstructive Pulmonary Disease, Asthma, Osteoarthritis, Kidney Diseases, Breast Neoplasms, Colorectal Neoplasms, Uterine Pancreatic Neoplasms, Cervical Neoplasms, Lung Neoplasms, Communicable Diseases.

Interventions:
The researchers searched for the following terms for public health interventions, modifiable behavioral changes, or biological risk factors:
Public Health, Risk Factors, Risk, Life Style, Health Promotion, Exercise, Smoking, Smoking Cessation, Sexual Behavior, Food Services, Fruit, Mass Screening, Breast Feeding, Air Pollution, Community Health Services, School Health Services, Healthy People Programs, Cholesterol, Body Mass Index, Blood Pressure, Prevention.

Study Design:
The researchers searched for the following epidemiological study design keywords:
Program Evaluation, Intervention Studies, Prospective Studies, Case-Control Studies, Longitudinal Studies, Follow-Up Studies, Survival Rate, Hospitalization, Proportional Hazards Models, Incidence, Data Collection, Randomized Controlled Trials as Topic, Time Factors, Regression Analysis, Diet Surveys, Cohort Studies, Outcome Assessment (Health Care), Workplace, Cross-Sectional Studies, Disease Progression, Risk Assessment, Pilot Projects, Effectiveness.

Terms were searched as both keywords and as Medical Subject Headings (MESH).

95 Study quality rankings were ranked A-D based on study designs of: A) randomized controlled studies; B) quasi-experiental studies without selection bias; C) pre-post studies with no comparison group, or comparison groups with likely selection bias; D) study design of lower quality than the above. Studies that met the criteria for A-C were included in final literature review. This schema is from Center for Health Care Strategies, Inc. (2007). The ROI Evidence Base: Identifying Quality Improvement Strategies with Cost-Saving Potential in Medicaid. Retrieved from <http://www.chcs.org/usr_doc/ROI_Evidence_Base.pdf> (accessed April 23, 2008).

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